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Revision of the Cactus Plant Bug Genus *Hesperolabops* Kirkaldy (Hemiptera: Miridae)

By Richard C. Froeschner
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High among the successful attempts to control weeds by manipulation of their insect enemies stands the control of cacti. Huffacker (1959, p. 253) has summarized an important part of that effort: "The urgency for controlling prickly pear in Australia in the 1920's was unchallengeable, and the subsequent success of that work has stood as a landmark not likely to be equalled." But to demonstrate the complexity of the role of the cactus in man's economy, he continues:

> However, *Opuntia* spp. are not always considered pests. Use of these plants in Hawaii, South Africa, Madagascar, the United States, and Mexico as human food, fodder, and a source of water for stock on dry ranges has been reported. . . . Importation of *Cactoblastis cactorum* (Berg) into the United States has long been denied largely on such grounds, although it has been stated that, in West Texas alone, an area of some 60,000,000 acres of range land are infested with *Opuntia* and consequently suffer greatly lowered values. On spineless cactus plantations in some areas of South Africa it has been necessary to control the cochineal previously introduced against the related pest cacti.

Heeding Wilson's (1964, p. 225) statement that the "biological control of weeds is intimately connected with basic ecological problems," field workers seeking to understand the basic ecological problems in regards to cacti have been finding previously unreported relationships.

Attempts to identify specimens of cactus-frequenting insects submitted by F. D. Bennett revealed the need for a taxonomic revision of the mirid genus *Hesperolabops* Kirkaldy. For this genus, Carvalho's (1956, p. 106) "Catalogue of the Miridae of the world" listed three species of which one had two named varieties. Study shows that the two varieties deserve full specific status, that one of the species must be synonymized, and that one new species must be described.

Material for this revision consisted of specimens in the United States National Museum and in three lots furnished by F. D. Bennett, Commonwealth Institute of Biological Control, West Indian Station, Curepe, Trinidad, W.I.; by C. G. Martell, Escuela Nacional de Agricultura, Chapingo, Mexico; and by J. C. Schaffner, Texas A. and M. University, College Station, Tex.

To my wife, Elsie Herbold Froeschner, I am grateful for the illustrations.

The endings of the species names have been made to conform to the statement in the "Bulletin of Zoological Nomenclature" (1964, vol. 21, p. 172, Case 18), that all "-ops" names be treated as masculine.

Hesperolabops Kirkaldy

Hesperolabops Kirkaldy, 1902, p. 249.
Stylopidea Hunter, Pratt and Mitchell, 1912, p. 22.

Within its area of natural occurrence, North and Central America, members of this genus are recognized readily by the dorsolateral angles of the head being formed into long stalks that bear the eyes at their tips, as illustrated in figure 1.

The geographic range of this genus is from the southwestern United States (Texas) south to El Salvador.

Hesperolabops was described for a new species, *H. gelastops*, which is the type of the genus by virtue of being the only included species. *Stylopidea* was also described with a lone new species, *S. picta*, which is thereby the type of that genus. The Uhler credit for the name *Stylopidea* given with the original description apparently was received from Heidemann, "who examined all of the hemipterous insects taken on cactus" (Hunter et al, p. 17). His use of the name undoubtedly was based on specimens in the collection of the U.S. National Museum bearing the Uhler manuscript label with this name; however, no published Uhler treatment of that name has been found. Hunter, Pratt, and Mitchell's brief description of the color and the stalked eyes was adequate to gain for them the authorship of the genus and the species names. Knight (1928, p. 68) synonymized *Stylopidea* under *Hesperolabops*.

The frequent listing of these bugs from *"Opuntia"* suggests that they occur promiscuously on the various species of that genus; however, when the available specimens were arranged according to the present taxonomic treatment, the limited associated ecological data suggested the possibility of each species confining its attentions to one or at most a few species of cacti. At least, where specifically determined cactus hosts were found on specimen labels, one species of bug occurred on one cactus host: *H. gelastops* on *O. engelmannii; H. nigriceps* on *O. megacantha;* and the new species on *O. tomentosa.* The single host note for *H. periscopis* was for a cactus of another genus, *Acanthocereus horridus.* Field observations are needed to confirm or refute this theory of host specificity.

The species may be arranged in two groups by the following characters:

Group A (includes *nigriceps, sanguineus, mexica*)	Group B (includes *gelastops, periscopis*)
hemelytron wholly fuscous	hemelytron not wholly fuscous
frons strongly tumid (fig. 6)	frons weakly tumid (fig. 7)
male genital capsule with a long, slender process at right posterodorsal angle (figs. 16, 18, 26)	male genital segment without this process (fig. 3)

Nymphs associated with adults of *H. gelastops* and *H. sanguineus,* and therefore tentatively identified as these species, show the greatly elongated eye stalks characteristic of the imagos of the genus. In addition, the *H. sanguineus* nymphs show a much more tumid frons than do the nymphs of *H. gelastops*—even as do their respective adults.

Key to the Species of the Genus *Hesperolabops*

1. Hemelytra wholly fuscous to black (teneral specimens sometimes slightly paler along costa); male genital segment with a very long, slender process on right posterodorsal angle (figs. 16, 18, 26) 2
   Hemelytra not wholly fuscous; male genital segment without a long, slender process on right posterodorsal angle (figs. 3, 31) 4
2. Calli and/or collar blackened, at least laterally; scutellum fuscous to black except in depressed basal areas; right clasper of male without a long, slender, upcurved hook at apex (figs. 14, 20) 3
   Calli, collar and scutellum wholly red to orange red, in no part blackened; apex of right clasper of male with a long, slender, upturned hook that is almost as long as stout basal part (fig. 24); length 5.6–6.4 mm.
   sanguineus Carvalho
3. Calli with outer third or more of dorsal surface strongly fuscous to black; male genital segment with a small, slender hook laterad of base of long curved process at posterodorsal angle (fig. 18); length 6.3–7.3 mm.
   nigriceps Reuter
   Calli with fuscous to black coloring restricted to outer face, not invading dorsal surface; male without a hook at this point (fig. 16); length 6.2–7.0 mm.
   mexica, new species

4. Hemelytron, except apical two-thirds of clavus, inner apical angles of coria and membrane, wholly red; right clasper without a rectangular angulation dorsally (fig. 30); length 6.2 mm . . . . . **periscopis** Knight

Hemelytron fuscous with costa and adjacent edge of corium and outer third or more of cuneus cream colored to white; right clasper of male with a large, rectangular angulation dorsally (fig. 4); length 5.4–7.0 mm. **gelastops** Kirkaldy (fig. 1)

Hesperolabops gelastops Kirkaldy

FIGURES 1–5, 7–10

Hesperolabops gelastops Kirkaldy, 1902, p. 249, pl. 5 (fig. 2).
Stylopidea picta Hunter, Mitchell, and Pratt, 1912, p. 22. [New synonymy.]

Within the genus this is the only species with white or cream costal edges on corium and cuneus of fuscous forewings. The male is recognized readily by the dorsal angulation on the right clasper (fig. 4). Another male feature worthy of note and present in no other species of the genus is a bispinose area within the genital capsule (fig. 5, stippled area).

The distinctness of two species, *H. gelastops* and *H. picta*, as recognized by Knight (1928, p. 68) and accepted by Carvalho (1955, p. 106) is not supported by modifications of the male genital segment: one structural pattern is involved. The color pattern shows some variation in intensity of the fuscous areas, being paler in the northern specimens where the calli are rosaceous in contrast to the black color of the calli of most of the southern specimens. The pale costal margin also varies in width and gives the illusion of variation in stoutness of the specimens. Pale individuals as well as intermediates, however, occur throughout the range and eliminate any need for taxonomic recognition. Thus, morphologically, *H. picta* must fall as a synonym of *H. gelastops*; however, as noted below, there is a biological difference between the northern and southern populations of the species so defined.

The type specimen of *H. gelastops* was originally in the Kirkaldy collection (Kirkaldy 1902, p. 243). For *H. picta* no types were designated with the original description because Hunter et al did not intend their study to present *H. picta* as a new species; however, their description gained the authorship for them and permitted ready recognition of it. Carvalho (1955, p. 226) selected a San Antonio, Tex., female lectotype (USNM type 67964) from 83 "cotypes" in the U.S. National Museum collection.

As now understood, this is the most widespread species in the genus, occurring from Texas south to central Vera Cruz in Mexico.

Hunter et al placed this species ninth in a list of 13 of "The Principal Insects Injurious to Opuntia in Order of their Importance." They reported it attacking the joints between the pads: "The injury is not

conspicuous. It causes the plants to assume a spotted appearance, but, except where the bugs are unusually abundant, the joints recover. It is not a true cactus insect, but has been found upon a variety of other plants."

The occurrence on other plants may be due to a more general taste or may result from the nervous activity of a bug that flies quickly when disturbed. Observations of flying stages of insects resting on a plant should not be interpreted as indicating a host preference—any convenient object can serve as a resting perch. Nearly all ecological notes on specimens, including all immatures, associate these insects with *Opuntia* cactuses, some specimens being labelled from *O. engelmannii* specifically. The only exception was a series of four adults taken on May 18 from "castor beans" at Brownsville, Tex. These specimens were also a little shorter than the minimum figure given in the key, measuring 4.5 to 4.7 mm.

The data cited below show two periods of adult occurrence in Texas: April 12 to June 3 and later from September 5 to November 13. In contrast, the several Mexican specimens were taken during the intermediate summer period in July and August. Whether this timing is real or an artifact resulting from too few records will be decided only by more collecting in the appropriate areas.

Distribution: 133 specimens examined. UNITED STATES: TEXAS: Apr. 12–June 3, Sept. 5–Nov. 28; Austin, Bastrop, Brownsville, Calvert, Cameron, Corpus Christi, D'Hanis, Garner State Park, Hebbronville, Hondo, Laredo, Live Oak County, Luxello, Nueces, San Antonio, San Diego, Seguin, Sharpsburg, Uvalde, Victoria. MEXICO: SAN LUIS POTOSI: July; El Salto; TAMAULIPAS: July; Tampico; VERA CRUZ: August; Cordoba, Jalapa.

Hesperolabops mexica, new species

FIGURES 6, 11–16

The wholly fuscous hemelytra coupled with the calli being darkened only laterally and not dorsally will permit recognition of this species. The male is recognizable on characters of the genital capsule by the combination of no small slender hook laterad of the long, slender process on the posterodorsal angle and no hook at the apex of the right clasper.

Holotype male: length 7.05 mm; width across combined hemelytra 2.70 mm.

Head: dark red, strongly tumid frons (fig. 6) blackened; width across eyes 1.23 mm, between eyes 0.75 mm, between bases of eye stalks 0.25 mm; labium reaching to apex of fourth abdominal sternite, segments I–IV measuring 0.91, 1.00, 0.31, 0.26 mm respectively; antennae black, densely and finely pubescent, segments I–IV measuring

0.70, 1.74, 0.78, 0.56 (shrivelled) mm respectively. Pronotum: length 1.04 mm, width 1.94 mm; dorsal surface, including calli dorsally and broad central part of collar, orange red; deflexed lateral parts, except rounded impressions, and usually vertical lateral face of prominent calli fuscous to black; disc coarsely and closely punctate posterior to calli; each callus connected to collar by two ridges, a small oblique one near inner end and a longitudinal one at midwidth. Scutellum black with four basal impressions and mesoscutum red; surface not polished.

Hemelytra dull, opaque, fuscous, sometimes with bluish reflections; surface, except membrane, with numerous coarse, very shallow and obscure punctures, each bearing a short, fine, light bristle. Membrane and veins black, with a single large cell.

Ventral surface dark red, blackened on meso- and metapleura (except in rounded impressed areas) and along sides of abdomen. Legs, including tarsi, brownish to black; tarsi widening to apex.

Holotype male: Queretaro, Queretaro, Mexico, August 1963, F. D. Bennett, *Opuntia tomentosa* (USNM type 67965). Allotype female: Guanajuato, Mexico, Oct. 14, 1926, Mortensen, on *Opuntia*. Paratypes: three males (one missing head and prothorax) with same data as holotype; Morelia, Michoacan, Mexico, Oct. 19, 1926, Mortensen, on *Opuntia*, one male and two females (USNM and collection of F. D. Bennett).

The entire series is quite uniform, except that on old and teneral specimens the legs and hemelytra tend to be noticeably paler than on fresh, well-sclerotized individuals.

The species name is from "Mexica," an alternate name for the Aztec Indians, whose role in the area whence these specimens came was very great.

Hesperolabops nigriceps Reuter, new status

FIGURES 17–21

Hesperolabops gelastops var. *nigriceps* Reuter, 1908, p. 152.

The uniformly fuscous hemelytra coupled with the distinct blackening of part or all of the dorsal surface of the calli separate *H. nigriceps* from the other species of the genus. Males can be recognized by modifications of the genital capsule, the character easiest to use being the presence of a small hook laterad of the base of the long process on the posterodorsal angle.

No type material of this species was examined; however, the description of the single type specimen, credited with being in the Vienna Naturhistorisches Museum, commented upon the unicolorous dark hemelytra and the infuscate calli and left no doubt about applying the name to this form.

Ecological notes on specimens collected by F. D. Bennett cite them from *Opuntia megacantha* or simply *Opuntia.*

Distribution: While *H. nigriceps* was described from "Mexico," data from 29 specimens further restrict its known distribution to only two Mexican states near Mexico City. MEXICO: MEXICO: July, August, November; Chapingo. TLAXCALA: July; Calpulalpam.

Hesperolabops periscopis Knight

FIGURES 27–31

Hesperolabops periscopis Knight, 1928, p. 67.

The dominantly red dorsum (except apical two-thirds of clavus, inner apical angles of coria, and membrane, all of which are fuscous) sets this species part from all others in the genus. The male is well marked by the long, thick, decurved spine on the margin of the genital capsule immediately above the insertion of the right clasper.

Hesperolabops periscopis was described from two females taken on Dec. 6, 1927, at La Union, El Salvador. The holotype female is in the United States National Museum (type no. 52833). A note accompanying the original description said, "This species was found commonly on both Cerei and Opuntiae."

Distribution: A good series of both sexes from the cactus *Acanthocerus horridus* (photograph of host identified by the late Dr. E. Yale Dawson, Smithsonian Institution) in the southernmost Mexican State of Chiapas agrees very well with the holotype and extends the distribution of the species north across Guatemala into southern Mexico. Exact collecting information on the specimens is as follows: "7 mi. N.W. Acala, Chiapas, Mexico, June 23, 1965, Burke, Mayer and Schaffner."

Hesperolabops sanguineus Carvalho, new status

FIGURES 22–26

Hesperolabops gelastops var. a Reuter, 1908, p. 152.
Hesperolabops gelastops var. *sanguinea* Carvalho, 1957, p. 106.

The wholly red pronotum and scutellum coupled with the unicolorous fuscous to black hemelytra will delimit this species from all the others in the genus. The male is unique within the genus by possessing the long, slender, upturned hook at the end of the right clasper (fig. 24).

Crediting of the name "*sanguineus*" to Carvalho, as above, needs an explanation, especially since Carvalho in his "Catalog" credits it to Reuter. In Reuter's (1908, p. 152) treatment of Mexican specimens of this genus, two varieties of *gelastops* were described and

designated as "var. a" and "var. b." Reuter apparently intended to supply a name for each as he followed "var. b" with the name "*nigriceps* m." No name, however, appeared after the designation "var. a." The description of each variety began with a generalized color term—in the case of "var. a," this was "sanguinea." Carvalho, in assembling his catalog, apparently assumed this color term to be coordinate with "*nigriceps*" and used it accordingly. It is clear, however, that Reuter gave no name to this segregate and that Carvalho did; therefore, the authorship must be given to the latter.

The original description of three specimens in the Vienna Naturhistorisches Museum is inclusive enough to permit ready recognition of this species by the color characters stated above.

The original localities were Guadaloupe and Orizaba, Mexico. Just which Mexican "Guadaloupe" was involved is not stated; however, the Orizaba locality coupled with the present series of 13 specimens from Cuernavaca, Morelos, suggests that this species occurs only south and east of Mexico City.

The seven adults and six nymphs were captured during July and August from *Opuntia*, according to their collector, N. L. H. Krauss.

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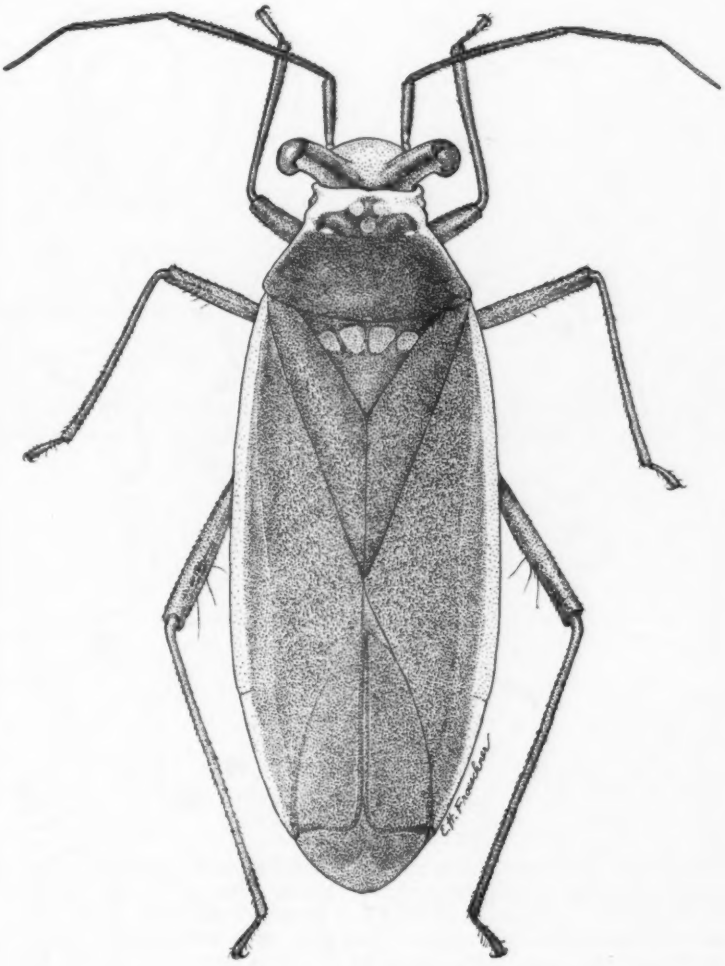
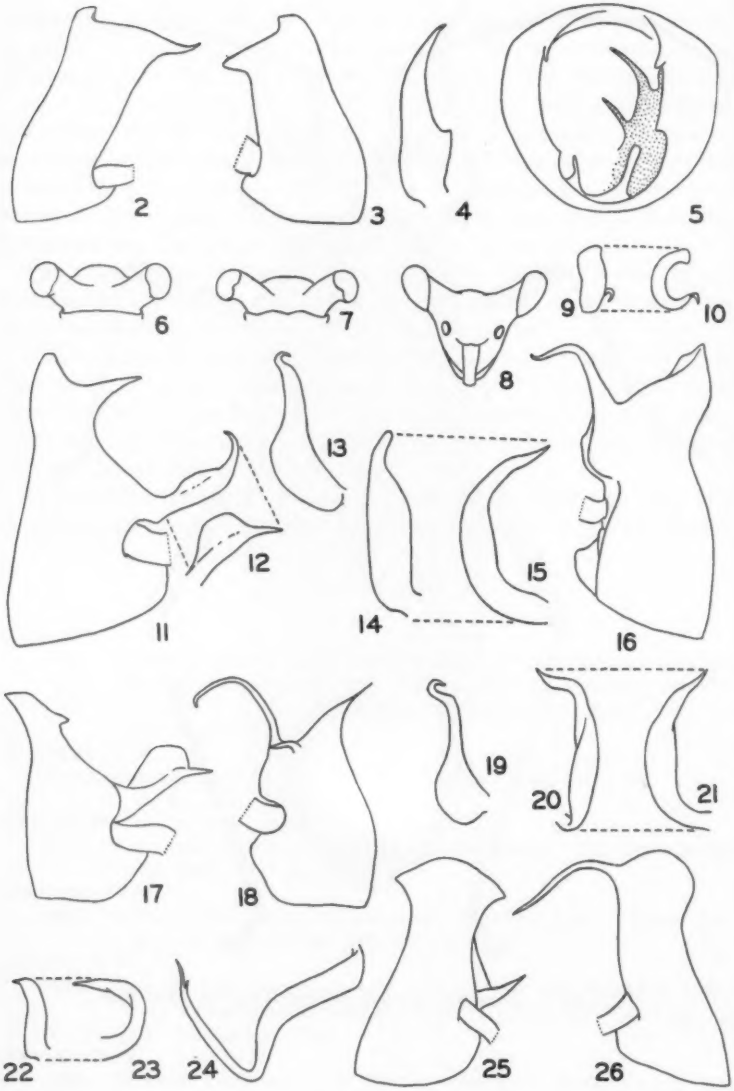


FIGURE 1.—*Hesperolabops gelastops:* general habitus, dorsal view.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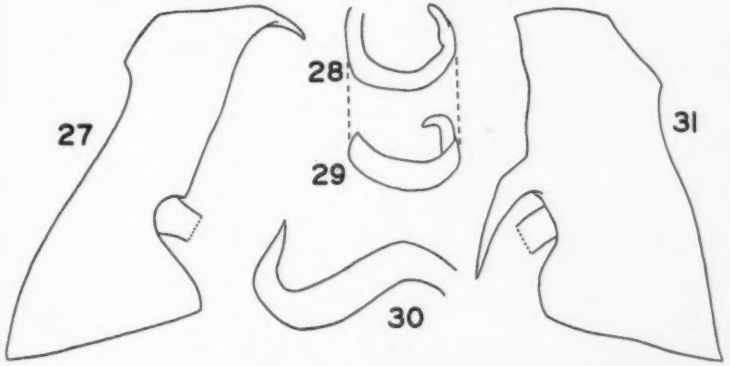

FIGURES 27–31.—*Hesperolabops periscopis:* 27, genital capsule, left view; 28, 29, left clasper, dorsal and posterior views; 30, right clasper, posterior view; 31, genital capsule, right view.

FIGURES 2–26.—*Hesperolabops gelastops:* 2, 3, genital capsule, left and right views; 4, right clasper, lateral view; 5, genital chamber, posterior view. *Hesperolabops mexica:* 6, head, dorsal view. *Hesperolabops gelastops:* 7, 8, head, dorsal and anterior view; 9, 10, left clasper, lateral and dorsal views. *Hesperolabops mexica:* 11, 12, genital capsule, left view and projection of posterior process; 13, left clasper, lateral view; 14, 15, right clasper, lateral and dorsal views; 16, genital capsule, right view. *Hesperolabops nigriceps:* 17, 18, genital capsule, left and right views; 19, left clasper, lateral views; 20, 21, right clasper, ventral and lateral views. *Hesperolabops sanguinea:* 22, 23, left clasper, lateral and dorsal views; 24, right clasper, lateral view; 25, 26, genital capsule, left and right views (all genital structures to same scale).

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